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09/689,114	10/12/2000	Hideo Shibahara	NEKW 17.876	6403

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EXAMINER

AKKAPEDDI, PRASAD R

ART UNIT PAPER NUMBER

2871

DATE MAILED: 02/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/689,114

Applicant(s)

SHIBAHARA, HIDEO

Examiner

Prasad R Akkapeddi

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

## DETAILED ACTION

### *Specification*

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Objections*

2. Claim 8 is objected to because of the following informalities: The equation as written is not correct. The parameter 'F' is missing from the final solution. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1,2,10,11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murouchi (U.S. Patent No. 6,067,144) in view of Mathew et al. (U.S. Patent No. 6,122,033).
  - a. As to claim 1: Murouchi discloses a liquid crystal display cell (Fig. 3), comprising a pair of substrate structures (9,10) having plural pixels (P) where an image is produced, liquid crystal filling a gap between the substrate structures of the pair (abstract), column spacers (4,5) formed between the substrates.

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Murouchi does not explicitly disclose the contact area between the column spacers and the total area occupied by the pixels. Mathew on the other hand, in disclosing a liquid crystal display device, discloses that the diameter of the spacers is between 2 to 4 micrometers and the length/width of the pixels are on the order of 100 micrometers (Col. 1, lines 32-35). Hence the area of the spacers is between 3 to 12 square micrometers and the area of the pixel is 10000 square micrometers making the ratio of the contact area between the spacer to the area occupied by the pixel is in the range from 0.030 % to 0.120 %.

Note that the range for the contact area as disclosed by Mathew overlaps the range from 0.050% to 0.15% (asserted in claim 1). Therefore, the range in claim 1 would have at least been obvious. See In re Malagari, 499 F.2d 197, 182 USPQ 549 (CCPA 1974).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the Mathew LCD device with the range of 0.05 % to 0.15 % as disclosed in claim 1 to cause little visual interference with the functioning of the pixel array (Col. 1, lines 35-37).

As to claims 2: Murouchi discloses that the column spacers (12a,12d) (Col. 1, lines 41-42) are respectively associated with the pixels.

As to claims 10 and 11: Murouchi discloses that each of the column spacers is associated with pixels and that the column spacers are classified into two groups (different heights, Figs 1-4) one of which is taller than the other.

2. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murouchi as applied to claim 2 above, in view of Ishikawa et al. (Ishikawa) (U.S. Patent No. 6,414,733).

Although the use of common electrode is quite common in liquid crystal displays, Murouchi does not explicitly disclose the common electrode. Ishikawa on the other hand, in disclosing a liquid crystal display device not only discloses column spacers, TFT, pixel electrodes but also discloses the use of common electrode (22) on one of the substrates. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the common electrode as disclosed ed by Ishikawa to the LCD disclosed by Murouchi to enhance the display efficiency and contrast ratio.

3. Claims 7-9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murouchi and Ishikawa as applied to claim 6 above, and further in view of Ogura et al. (Ogura) (U.S. Patent No. 5,739,888).

Ishikawa does not disclose the additional reinforcement spacers in the sealing layer nor the specific relationship between the diameter of the spacer to the thicknesses of the various films. Ogura discloses a sealing layer (28) reinforced with spacers (29) and the relationship of the diameter of the spacer to the thicknesses of various films (Col. 6, line 62-65). The diameter of the spacers is about 2-4 micrometers as disclosed by Mathew.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the specified thickness

relationship as disclosed by Ogura to the display device as recited in instant claims 8 and 9 so as to provide a display element which is free from irregularities in luminance in its effective display area and has uniform display quality (Col. 3, lines 32-34 of Ogura).

4. Claims 3-5,12,14 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murouchi and Mathew as applied to claims 1 and 10 above, and further in view of Mashiko et al. (Mashiko) (U.S. Patent No. 6,288,766).

Mathew discloses additional column spacers (12b,12d) (Col. 1, line 37) formed outside said plural pixels. Murouchi also discloses a sealing layer formed between the pixels and a peripheral area (Col. 5, line 7). Neither Murouchi nor Mathew explicitly disclose a method of fabricating the device. However, Mashiko in disclosing a liquid crystal display device discloses a method of manufacture and a method for injecting the liquid crystal material, pressure adjusting means (Col. 10, line 19) and the alignment and sealing of the two substrates. Mashiko also discloses a reservoir (62) (Col. 1, lines 26-38) and the pressure being from vacuum to .01 and 1-50 torr (Col. 11, lines 57-60) that is less than the atmospheric pressure as recited in claim 14. When atmospheric pressure being equal to 110,000 N/m<sup>2</sup> and also equals to approximately 760 torr (the applicant is requested to refer to any text book in Physics for these conversion factors), it would have been obvious to one having an ordinary skill in the art to convert the above units to come up with the recited features of 0.01 N/m<sup>2</sup> to 6KN/m<sup>2</sup> as recited in claims 16 and 17. Since the cell is still being assembled when the

pressure is being applied, there is no electrical power and the room temperature operation is disclosed in abstract and elsewhere.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the method of fabricating the device as disclosed by Mashiko to the display device of Murouchi and Mathew to inject the liquid crystal material into the cell in a short time without deforming or damaging the cell while eliminating an occurrence of unwanted deficient injection of the liquid crystal, bubbles and cavitation (Col.3, lines 43-47 of Mashiko).

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: (a) Hoyt (U.S. Patent No. 5,953,087) discloses an internal reservoir to catch the excess liquid crystal material and (b) Smith Jr. (U.S. Patent No. 5,016,987) discloses a reservoir (78) to catch the excess liquid crystal material (Col. 5, lines 6-13).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasad R Akkapeddi whose telephone number is 703-305-4767. The examiner can normally be reached on 7:00AM to 5:30PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on 703-305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0530.

*RA*

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January 25, 2003

*RA*  
SUPERVISOR  
TECHNOLOGY CENTER 2800